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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of: **Fumikazu MACHINO et al.**

Group Art Unit: **1771**

Serial No.: **09/180,432**

Examiner: **Ula Corinna Ruddock**

Filed: **February 12, 1999**

P.T.O. Confirmation No.: 6772

For: **SOUND ABSORBING AND HEAT INSULATING MATERIAL, AND METHOD OF MANUFACTURING THE SAME**

SUBMISSION OF APPEAL BRIEF

Commissioner for Patents
Washington, D.C. 20231

September 25, 2002

Sir:

Submitted herewith are an original and two copies of an Appeal Brief in the above-identified U.S. patent application.

Also enclosed is a check in the amount of **$320.00** to cover the cost of filing this Appeal Brief. In the event that any additional fees are due with respect to this paper, please charge Deposit Account No. 01-2340. This paper is filed in triplicate.

Respectfully submitted,

ARMSTRONG, WESTERMAN & HATTORI, LLP

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Enclosures: Duplicate of this paper; Appeal Brief and two copies; and check for **$320.00**
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THE UNITED STATES PATENT AND TRADEMARK OFFICE
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BRIEF ON APPEAL

Commissioner for Patents
Washington, D.C. 20231

September 25, 2002

Sir:

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Osaka Gas Co., Ltd., as indicated in the assignment recorded February 12, 1999, in reel 9767, frame 0920.

II. RELATED APPEALS AND INTERFERENCES

To Appellant's knowledge, there are no other appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-12 and 15-43 are pending in this application. Claims 13, 14 and 44-54 have been canceled during prosecution.

Claims 1-12 and 15-43 currently stand rejected, and each of claims 1-12 and 15-43 is on appeal here.

IV. STATUS OF AMENDMENTS

No amendment to the claims has been made subsequent to the final Office action dated March 28, 2002 (Paper No. 24). The Response under 37 CFR 1.116 filed on June 12, 2002, contained no amendment.

V. SUMMARY OF THE INVENTION

Claims 1, 10 and 11 are the independent claims in the application. The invention of claim 1 may be generally understood with regard to the text of the claim, as follows:

1. A thermal acoustic insulation material comprising:

a multiplicity of anisotropic pitch-based carbon fibers having an average fiber diameter of not less than 0.5 μm but less than 2 μm and an average fiber length of 1 mm to 15 mm, said carbon fibers being non-galvanic corrosive and being bonded by a thermosetting resin at contact points of said carbon fibers so as to form a carbon fiber aggregate having a bulk density of from 3 kg/m^3 to 10 kg/m^3;

wherein said thermal-acoustic insulation material is non-galvanic corrosive.

Thermal acoustic insulation materials are discussed in the specification on pages 1-2. Anisotropic pitch is discussed on page 18. The carbon fibers have specific limitations on average fiber diameter and average fiber length. They are non-galvanic corrosive, as discussed on pages 10-

14 of the specification. The fibers are bonded by a thermosetting resin to form a carbon fiber aggregate, as discussed on page 33. The carbon fiber aggregate in claim 1 has specific limitations on bulk density.

Claims 2-9 and 15-41 depend ultimately from claim 1. These claims include further limitations further limiting the galvanic current of the thermal acoustic insulation material, average fiber diameter of the fibers, tensile strength of the thermal acoustic insulation material, compression recovery rate of the material, thermal conductivity of the material, vertical incident acoustic absorptivity of the material, and a product-by-process limitation on the anisotropic pitch used to prepare the carbon fibers.

Independent method claim 10 is a method of manufacturing a thermal acoustic insulation material, as follows:

10. A method of manufacturing a thermal-acoustic insulation material, comprising the steps of:

producing spun fibers having an average fiber diameter less than 2 μm and an average fiber length of 1 mm to 15 mm by heating and melting anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon, then discharging a melted matter out of a spinning nozzle and at the same time, blowing a heated gas from around the spinning nozzle in the same direction to which the melted matter is discharged;

manufacturing non-galvanic corrosive carbon fibers by infusibilizing spun fibers and thereafter carbonizing said carbon fibers at not lower than 550°C. but lower than 800°C.;

forming a carbon fiber aggregate by aggregating and compressing said non-galvanic corrosive carbon fibers to a bulk density of from (3 - b) kg/m^3 to (10 - b) kg/m^3;

spraying a thermosetting resin solution to said carbon fibers so that the amount of a thermosetting resin in relation to the amount of the carbon fiber aggregate is made to be b, where b is an arbitrary number fixed so that the bulk density is positive and the relationship $0.3 \leq b \leq 4$ is satisfied; and

curing the thermosetting resin by heating the carbon fiber aggregate sprayed with the thermosetting resin solution to manufacture a three dimensional structure of carbon fibers wherein said carbon fibers are bonded at contact points thereof, said three-dimensional structure having a bulk density of from 3 kg/m^3 to 10 kg/m^3.

This claim recites five main steps: producing spun fibers; manufacturing non-galvanic corrosive fibers by infusibilizing and carbonizing the spun fibers; forming a carbon fiber aggregate; spraying a thermosetting resin, with a limitation on the ratio of resin to carbon fiber aggregate, this ratio b being also related in a formula to the bulk density; and curing the thermosetting resin. The step of producing spun fibers, including obtaining anisotropic pitch, is discussed in general in the specification on page 32, and the infusibilizing and carbonizing treatment is also discussed on page 32. The step of forming the aggregate is discussed on page 33. The spraying step is discussed on page 33, and the limitations associated with the parameter b are discussed on page 34. Further discussion occurs on pages 35-38.

Claim 42 depends from claim 10 and further limits the temperature of carbonizing the spun fibers.

Independent claim 11 also recites a method of manufacturing thermal-acoustic insulation material, as follows:

11. A method of manufacturing thermal-acoustic insulation material, comprising the steps of:

producing spun fibers having an average fiber diameter less than 2 μm and an average fiber length of 1 mm to 15 mm by heating and melting anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon, then discharging a melted matter out of a spinning nozzle and at the same time, blowing a heated gas from around the spinning nozzle in the same direction in which the melted matter is discharged;

manufacturing non-galvanic corrosive carbon fibers by infusibilizing said spun fibers and thereafter carbonizing said spun fibers at not lower than 550°C. but lower than 800°C.;

forming a carbon fiber aggregate having a bulk density less than 1.3 kg/m^3 by aggregating said non-galvanic corrosive carbon fibers;

spraying a thermosetting resin solution to the carbon fiber aggregate; and

curing the thermosetting resin by compressing and heating the carbon fiber aggregate sprayed with the thermosetting resin solution to bond contact points of said carbon fibers and

thereby manufacture a three dimensional structure of carbon fibers having a bulk density of from 3 kg/m^3 to 10 kg/m^3.

Claim 11 recites five basic steps: producing spun fibers, manufacturing spun fibers, manufacturing non-galvanic corrosive fibers, forming a carbon fiber aggregate, spraying a thermosetting resin solution and curing the thermosetting resin. The steps of manufacturing spun fibers and manufacturing non-galvanic corrosive fibers are the same as in claim 10. The step of forming a carbon fiber aggregate includes a limitation that the bulk density of the aggregate is less than 1.3 kg/m^3. The spraying and curing steps in claim 11 do not have a specific limitation on the relative amounts of thermosetting resin and carbon fibers. Claim 12 depends from claim 11 and limits the step of forming the carbon fiber aggregate to a step involving dropping carbon fibers from a height of at least 100 cm. Claim 43 depends from claim 11 and further limits the temperature of carbonizing the spun fibers.

VI. ISSUES

The issues here are those stated in the rejections in the final Office action of March 28, 2002. Specifically:

A. Whether claims 1-12 and 15-43 are unpatentable under 35 U.S.C. 112, first paragraph, for containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

B. Whether claims 10 and 42 are unpatentable under 35 U.S.C. 112, second paragraph, for being indefinite.

C. Whether claims 1-9, 11, 12, 15-41 and 43 are unpatentable under 35 U.S.C. 103(a) over McCullough, Jr. et al. (U.S. Patent No. 4,997,716) in view of Otani et al. (U.S. Patent No. 4,504,455).

VII. GROUPING OF THE CLAIMS

Appellants divide the claims into three groups, based on the three independent claims, 1, 10 and 11.

That is, claims 1-9 and 15-41 stand or fall together as group I.

Claims 10 and 42 stand and fall together as group II.

Claims 11, 12 and 43 stand or fall together as group III.

VIII. ARGUMENTS

Paragraph (i)(A). Rejections under 35 U.S.C. 112, first paragraph:

Issue A. Whether claims 1-12 and 15-43 are unpatentable under 35 U.S.C. 112, first paragraph, for containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

Argument

In the Final Office action of March 28, 2002, the Examiner indicates that there is no support for the limitation "an average fiber diameter of not less than 0.5 μm but less than 2 μm" in claim 1. This limitation was added to claim 1 of the Amendment of January 4, 2002, as follows: "carbon

fibers having an average fiber diameter of not less than 0.5 μm ~~to~~ but less than ~~5~~ 2 μm". The Examiner presumably is rejecting claims 10 and 11 for the limitation of spun fibers "having an average fiber diameter less than 2 µm ...", which was added in the Amendment of January 4, 2002.

Appellants argue that the Examiner is in error in stating that there is no written description support for the limitation of "having an average fiber diameter of less than 2 µm". Rather, Appellants assert that there is full written description support for this limitation. In asserting this, Applicants first note that MPEP 2163.05 (III) states:

> III. RANGE LIMITATIONS
>
> With respect to changing numerical range limitations, the analysis must take into account which ranges one skilled in the art would consider inherently supported by the discussion in the original disclosure. In the decision in *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976), the ranges described in the original specification included a range of "25%-60%" and specific examples of "36%" and "50%." A corresponding new claim limitation to "at least 35%" did not meet the description requirement because the phrase "at least" had no upper limit and caused the claim to read literally on embodiments outside the "25% to 60%" range, however a limitation to "between 35% and 60%" **did meet the description requirement**. (Emphasis added)

That is, a claimed range that is narrower than a described range meets the description requirement.

In the case of claim 1, the Amendment of January 4, 2002, served to narrow the claimed range of "0.5 μm to 5 μm" to -- not less than 0.5 μm but less than 2 μm --. Specifically, the upper end of the range was lowered from 5 μm to less than 2 μm. This represents only a narrowing of the supported range, and therefore this amendment is inherently supported, according to *In re Wertheim*.

Secondly, Applicants note that the specification on page 20, line 24, discloses "carbon fibers having an average diameter of approximately 2 μm or smaller ...". This further provides support for the specific recitation of "less than 2 μm" as the upper limit of the range.

Appellants' above arguments are also applicable to the limitation of "spun fibers having an average fiber diameter less than 2 μm ..." in claims 10 and 11. Claims 10 and 11 are fully supported by the specification.

Appellants therefore assert that each of claims 1-12 and 15-43 is fully supported. This argument is applicable to all three claim groups in this Appeal.

In the Advisory Action of July 16, 2002, the Examiner did not specifically address Applicants' request for reconsideration of this rejection, which was presented in the Response of June 12, 2002.

Paragraph (ii): Rejections under 35 U.S.C. 112, second paragraph.

<u>**Issue B**</u>. Whether claims 10 and 42 are unpatentable under 35 U.S.C. 112, second paragraph, for being indefinite.

<u>**Argument**</u>

In the final Office action of March 28, 2002, the Examiner indicates that the limitation regarding "b" is unclear. The Examiner states that if "b" were 3.99, the bulk density would be negative.

Appellants argue that the limitation regarding "b" is not unclear. Specifically, Appellants respectfully assert that the Examiner is incorrect in stating that the claims allow for a negative bulk density.

Claim 10 clearly recites that "b is an arbitrary number fixed so that the bulk density is positive ...." Therefore, the claim **cannot** recite a negative bulk density. In the manufacturing process, the arbitrary number "b", which is limited to a value between 0.3 and 4, is a ratio of the

amount of thermosetting resin to the amount of carbon fiber aggregate. The value of "b" is determined by the amount of thermosetting resin added.

The Examiner questions the hypothetical case where "b" is 3.99. As noted, the bulk density in the third step of claim 10 is recited to be between (3-b) and (10-b), but must also be positive. Therefore, if b is greater than 3, the density is limited to be a positive value, that is, a value between 0 and (10-b). The density value of (3-3.99) = -0.99 is not permitted by the claim.

Appellants therefore assert that claims 10 and 42 are not indefinite. This is applicable to claim group II in the Appeal.

In the Advisory Action of July 16, 2002, the Examiner did not specifically address Applicants' request for reconsideration of this rejection, which was presented in the Response of June 12, 2002.

Paragraph (iv): Rejections under 35 U.S.C. 103.

<u>**Issue C.**</u> Whether claims 1-9, 11, 12, 15-41 and 43 are unpatentable under 35 U.S.C. 103(a) over McCullough, Jr. et al. (U.S. Patent No. 4,997,716) in view of Otani et al. (U.S. Patent No. 4,504,455).

Although this rejection is applied only to claim groups I and III, Appellants here also discuss this rejection as applied to claim group II (claims 10 and 42).

<u>**Argument**</u>

1) Errors in the rejection and specific limitations not described in the prior art relied upon.

<u>a) Regarding the limitation on diameter of the carbon fibers in claims 1, 10 and 11.</u>

In the final Office action of March 28, 2002, the Examiner discusses the teaching of McCullough, Jr. et al. as including a teaching that "the diameter of the carbon fibers of the invention range from 2 to 25 microns (column 4, lines 20-28)." In this Office action, the Examiner does not appear to address the limitation of claim 1 of an "average fiber diameter of not less than 0.5 μm but less than 2 μm" and the limitation of claims 10 and 11 of "an average fiber diameter less than 2 μm". Appellants note that all of the pending claims therefore require fibers having an average fiber diameter less than 2 μm.

Applicants respectfully submit that neither of the cited references provides any teaching, suggestion or motivation for the limitation of the present claims that the carbon fibers have "an average diameter of not less than 0.5 μm but less than 2 μm". The Examiner has cited no teaching, suggestion or motivation in either reference for this claim limitation, and therefore no *prima facie* case of obviousness can be made for the present claims using these references.

Applicants had argued that McCullough, Jr. discloses carbon fibers having a fiber diameter of 2 to 25 microns (column 4, lines 25-27), and there is no overlap between that range and the range of "not less than 0.5 μm but less than 2 μm" in claim 1. McCullough, Jr.'s states that the range is "more preferably 4 to 12 microns" (column 4, line 27), which clearly argues **against** a suggestion in McCullough, Jr. to use fibers shorter than 2 μm. This limitation alone completely distinguishes all of the present claims from McCullough, Jr.

Likewise, Otani et al. does not teach, suggest or motivate one to use a carbon fiber with an average diameter being not less than 0.5 μm to less than 2 μm. In fact, Otani et al. does not appear to discuss fiber diameter in detail. Otani et al. does disclose in Example 1 that the extruder for spinning fibers had an orifice diameter of 0.3 mm (300 μm) and that the length/diameter ratio was

3 (column 7, lines 54-55). This suggests use of fibers that are approximately 300 μm in diameter, which would appears to argue against any suggestion that fibers might be less than 2 μm.

In the Advisory action of July 16, 2002, (paper No. 26), the Examiner addresses Applicants' arguments regarding this limitation. The Examiner states (page 2):

> "while Applicant's range is less than 2 microns, McCullough, Jr's fiber diameter generally range from 2-25 microns (col. 4, ln 25-27). A prima facie case of obviousness exists when the claimed ranges overlap ranges disclosed by the prior art or where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties."

Appellants respectfully assert that the Examiner's argument is in error. In the present case, the claimed ranges for fiber diameter and the fiber diameter range disclosed in McCullough, Jr. do **not** overlap; therefore there is no teaching or direct suggestion for the claim limitation. In the absence of an overlap, there must be some other suggestion or motivation for the claim limitation, in order for there to be a *prima facie* case of obviousness.

The Examiner has implied that if the ranges are "close enough so that one skilled in the art would have expected them to have the same properties" there can be a *prima facie* case. Appellants respectfully disagree with this remark on several grounds.

First of all, the remark itself is incorrect because there is still no suggestion or motivation for the claim limitation in the prior art. The Examiner's remark appears to be purely one of hindsight–that once shown the claimed invention, one of skill in the art would somehow agree that "that would work".

Secondly, the very comment that "one of skill in the art would have expected them to have the same properties" is completely vague. The Examiner's rejection involves combining different limitations from two different references with an additional modification regarding the diameter.

(Appellant argues against other aspects of this combination below). However, the reference to the thinking of "one of skill in the art" is neither a suggestion from McCullough, Jr. nor from Otani et al. for the claimed limitation. Rather, it appears to be an attempt to provide some motivation for a yet further modification of the combination of McCullough, Jr. and Otani to yield a limitation clearly not in either reference. Yet, although this modification appears to be contrary to the teachings of the references, the Examiner indicates that this modification would somehow make no difference in the properties of McCullough, Jr.'s fire shielding composite structure. Appellants respectfully assert that this does not provide a motivation in the prior art for this modification.

In the Advisory action, the Examiner also states:

> "Applicant must show that the particular range is crucial, generally by showing that the claimed range achieves unexpected results relative to the prior art."

Since Appellants argue that there is no teaching, suggestion or motivation in the cited prior art for the claimed limitations on the fiber diameter, Appellants assert that the Examiner's stated *prima facie* case of obviousness is incorrect, and that no *prima facie* case of obviousness can be made using the cited references. As such, there is no need for Appellants to demonstrate "unexpected results".

These arguments apply to claim groups I, II and III in the Appeal.

b) Regarding anisotropic pitch

Claims 1, 10 and 11 all require anisotropic pitch-based carbon fibers. Claim 1 directly recites "anisotropic pitch-based carbon fibers" and claims 10 and 11 recite methods in which spun fibers are produced from anisotropic pitch.

In the final Office action of March 28, 2002, the Examiner correctly notes that McCullough, Jr. does not provide a teaching or suggestion for use of anisotropic pitch. The Examiner provides this limitation of the present claims by substitution of Otani's anisotropic pitch.

Appellants note that rejection of the claims over a combination of McCullough, Jr. et al. and Otani et al. appears for the first time in the Office action of March 28, 2002. In the Examiner's Response to Arguments (point 8 of the Office action, on page 5), the Examiner explains that Otani is being applied instead of Takemura et al. to provide the limitations of carbonizing range and anisotropic pitch.

The Examiner's stated motivation for the combination of Otani and McCullough, Jr. (page 4 of the Office action) is to give increased strength to McCullough, Jr.'s fire resistant panel. However, Appellants argue that there is no indication in McCullough, Jr. that there is a need for increased strength. Moreover, there is no teaching in either reference to indicate that such a substitution would result in increased strength of McCullough, Jr.'s panel member 10.

Appellants also note that in order to produce the claimed invention, this proposed combination by the Examiner requires use of Otani's pitch to make fibers of less than 2 μm diameter, while Otani appears only to discuss fibers perhaps 300 μm in diameter, as discussed above.

Appellants argue that the Examiner's stated motivation for combining the anisotropic pitch of Otani with McCullough, Jr. is improper, and that the proposed combination still does not clearly provide all of the limitations of the claims under appeal. That is, the Examiner has failed to make a proper *prima facie* case of obviousness, and, in fact, no *prima facie* case of obviousness can be made using these references.

c) Regarding bulk densities

Claims 10 and 11 require a bulk density of the thermal acoustic material of 3 to 10 kg/m^3. As noted by the Examiner, McCullough, Jr. et al. discloses a range of bulk densities of 6.4 to 96 kg/m^3 (column 5, line 59), overlapping the recited range only between 6.4 and 10 kg/m^3.

Moreover, claim 10 has a limitation on the relative amount of thermosetting resin in relation to the amount of carbon fiber aggregate (parameter b), which is related to the bulk density of the aggregate (before addition of resin). Claim 11 has a limitation that the bulk density of the aggregate be less than 1.3 kg/m^3. McCullough, Jr. et al. does not appear to teach these limitations, and, given the only slight overlap of bulk densities of the final material between McCullough, Jr. and the present claims, it is not clear that McCullough, Jr. would in any way suggest these specific limitations of claims 10 and 11.

The Examiner does not appear to have indicated any suggestion or motivation in the prior art for the recited limitations on the bulk density of the aggregate in claims 10 and 11. This argues against a *prima facie* case of obviousness for these claims. This argument is therefore relevant to claim groups II and III.

2) Why the references, taken as a whole, do not suggest the claimed subject matter.

Appellants have pointed out above in point (a) that neither McCullough, Jr. et al. nor Otani et al. provides a teaching, suggestion or motivation for the recited limitation on fiber diameter in claim groups I, II and III. In point (b), Appellants argue that no motivation exists for a combination of Otani's anisotropic pitch with McCullough, Jr.'s carbon fibers, arguing against a *prima facie* case in claim groups I, II and III. In point (c), Appellants argue that the references do not provide a

suggestion or motivation for the recited limitation on bulk density of the aggregate as recited in claim groups II and III.

Appellants here would like to further suggest that the Examiner's proposed modification of the references is based on hindsight.

As an example, with regard to the diameter of the carbon fibers, Appellants note that the present specification indicates that the fibers should be 2 μm or smaller, in particular for reasons related to vertical incident acoustic absorptivity (page 20, line 23, to page 21, line 17). As noted above, McCullough, Jr. appears to give no motivation whatsoever for fibers smaller than 2 μm. Moreover, McCullough, Jr. does not mention vertical incident acoustic absorptivity. However, the Examiner states that: "In addition, the presently claimed properties of galvanic current, tensile strength, compression recovery rate, thermal conductivity, and **vertical incident acoustic absorptivity** would have been present once the McCullough, Jr. et al. product is provided" (page 4, lines 5-8, of the Office action of March 28, 2002; emphasis added).

Appellants argue that this statement by the Examiner is almost certainly incorrect, and no basis in technical reasoning has been provided by the Examiner to support it. Rather, this statement appears to be a hindsight reference to a property which is optimized in the present invention but is not discussed in the prior art reference.

To summarize, Appellants respectfully argue that for each of the claims at issue, at least several limitations are not taught, suggested or motivated by either McCullough, Jr. et al., Otani et al. or the general art. Therefore, no *prima facie* case of obviousness can be made for any of the pending claims. Appellants assert that the claims of groups I, II and III are novel and non-obvious over McCullough, Jr. et al. and Otani et al., taken separately or in combination.

IX. APPENDIX-CLAIMS INVOLVED IN THE APPEAL

Claims 1-12 and 15-43:

1. (Three Times Amended) A thermal acoustic insulation material comprising:

a multiplicity of anisotropic pitch-based carbon fibers having an average fiber diameter of not less than 0.5 μm but less than 2 μm and an average fiber length of 1 mm to 15 mm, said carbon fibers being non-galvanic corrosive and being bonded by a thermosetting resin at contact points of said carbon fibers so as to form a carbon fiber aggregate having a bulk density of from 3 kg/m^3 to 10 kg/m^3;

wherein said thermal-acoustic insulation material is non-galvanic corrosive.

2. (Amended) A thermal-acoustic insulation material as in claim 1, wherein said thermal-acoustic insulation material shows a galvanic current of 10 μA or lower in a galvanic cell having an electrode made of said thermal-acoustic insulation material, another electrode made of an aluminum plate, and an electrolytic solution of 0.45 wt. % aqueous sodium chloride solution.

3. (Three Times Amended) A thermal-acoustic insulation material as in claim 1, wherein said anisotropic pitched-based carbon fibers have an average fiber diameter of from 0.5 μm to 1.0 μm.

4. (Amended) A thermal-acoustic insulation material as in claim 1, which has a maximum tensile strength of 1.0 g/mm^2 or higher.

5. (Amended) A thermal-acoustic insulation material as in claim 1, which has a compression recovery rate of 70% or higher.

6. (Amended) A thermal-acoustic insulation material as in claim 1, wherein a minimum tensile strength of the orthogonal direction to said maximum tensile strength is 0.04 times or higher as said maximum tensile strength and, at the same time, a tensile strength of the orthogonal direction to both the direction of said maximum tensile strength and the direction of said minimum tensile strength is 0.76 times or higher as said maximum tensile strength.

7. (Amended) A thermal-acoustic insulation material as in claim 1, which has a thermal conductivity of 0.039 W/m• °C. or lower.

8. (Amended) A thermal-acoustic insulation material as in claim 1,wherein a vertical incident acoustic absorptivity at a frequency of 1000 Hz of said thermal-acoustic insulation material with a thickness of 25 mm is 48% or higher.

9. (Amended) A thermal-acoustic insulation material as in claim 1, wherein said carbon fibers are produced from anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon.

10. (Four Times Amended) A method of manufacturing a thermal-acoustic insulation material, comprising the steps of:

producing spun fibers having an average fiber diameter less than 2 μm and an average fiber length of 1 mm to 15 mm by heating and melting anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon, then discharging a melted matter out of a spinning nozzle and at the same time, blowing a heated gas from around the spinning nozzle in the same direction to which the melted matter is discharged;

manufacturing non-galvanic corrosive carbon fibers by infusibilizing spun fibers and thereafter carbonizing said carbon fibers at not lower than 550°C. but lower than 800°C.;

forming a carbon fiber aggregate by aggregating and compressing said non-galvanic corrosive carbon fibers to a bulk density of from (3 - b) kg/m^3 to (10 - b) kg/m^3;

spraying a thermosetting resin solution to said carbon fibers so that the amount of a thermosetting resin in relation to the amount of the carbon fiber aggregate is made to be b, where b is an arbitrary number fixed so that the bulk density is positive and the relationship $0.3 \leq b \leq 4$ is satisfied; and

curing the thermosetting resin by heating the carbon fiber aggregate sprayed with the thermosetting resin solution to manufacture a three dimensional structure of carbon fibers wherein said carbon fibers are bonded at contact points thereof, said three-dimensional structure having a bulk density of from 3 kg/m^3 to 10 kg/m^3.

11. (Amended) A method of manufacturing thermal-acoustic insulation material, comprising the steps of:

producing spun fibers having an average fiber diameter less than 2 μm and an average fiber length of 1 mm to 15 mm by heating and melting anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon, then discharging a melted matter out of a spinning nozzle and at the same time, blowing a heated gas from around the spinning nozzle in the same direction in which the melted matter is discharged;

manufacturing non-galvanic corrosive carbon fibers by infusibilizing said spun fibers and thereafter carbonizing said spun fibers at not lower than 550°C. but lower than 800°C.;

forming a carbon fiber aggregate having a bulk density less than 1.3 kg/m^3 by aggregating said non-galvanic corrosive carbon fibers;

spraying a thermosetting resin solution to the carbon fiber aggregate; and

curing the thermosetting resin by compressing and heating the carbon fiber aggregate sprayed with the thermosetting resin solution to bond contact points of said carbon fibers and thereby

manufacture a three dimensional structure of carbon fibers having a bulk density of from 3 kg/m^3 to 10 kg/m^3.

12. (Amended) A method of manufacturing a thermal-acoustic insulation material as in claim 11, wherein in said step of forming a carbon fiber aggregate, said non-galvanic corrosive carbon fibers are opened by the air and dropped from a height of at least 100 cm or higher onto a plane.

15. (Amended) A thermal-acoustic insulation material as in claim 2, which has a maximum tensile strength of 1.0 g/mm^2 or higher.

16. (Amended) A thermal-acoustic insulation material as in claim 3, which has a maximum tensile strength of 1.0 g/mm^2 or higher.

17. A thermal-acoustic insulation material as in claim 2, which has a compression recovery rate of 70% or higher.

18. (Amended) A thermal-acoustic insulation material as in claim 3, which has a compression recovery rate of 70% or higher.

19. A thermal-acoustic insulation material as in claim 4, which has a compression recovery rate of 70% of higher.

20. A thermal-acoustic insulation material as in claim 2, wherein a minimum tensile strength of the orthogonal direction to said maximum tensile strength is 0.04 times or higher as said maximum tensile strength and, at the same time, a tensile strength of the orthogonal direction to both the direction of said maximum tensile strength and the direction of said minimum tensile strength is 0.76 times or higher as said maximum tensile strength.

21. A thermal-acoustic insulation material as in claim 3, wherein a minimum tensile strength of the orthogonal direction to said maximum tensile strength is 0.04 times or higher as said maximum tensile strength and, at the same time, a tensile strength of the orthogonal direction to both the direction of said maximum tensile strength and the direction of said minimum tensile strength is 0.76 times or higher as said maximum tensile strength.

22. A thermal-acoustic insulation material as in claim 4, wherein a minimum tensile strength of the orthogonal direction to said maximum tensile strength is 0.04 times or higher as said maximum tensile strength and, at the same time, a tensile strength of the orthogonal direction to both the direction of said maximum tensile strength and the direction of minimum tensile strength is 0.76 times or higher as said maximum tensile strength.

23. A thermal-acoustic insulation material as in claim 5, wherein a minimum tensile strength of the orthogonal direction to said maximum tensile strength is 0.04 times or higher as said maximum tensile strength and, at the same time, a tensile strength of the orthogonal direction to both the direction of said maximum tensile strength and the direction of minimum tensile strength is 0.76 times or higher as said maximum tensile strength.

24. A thermal-acoustic insulation material as in claim 2, which has a thermal conductivity of 0.039 W/m•°C. or lower.

25. A thermal-acoustic insulation material as in claim 3, which has a thermal conductivity of 0.039 W/m•°C. or lower.

26. A thermal-acoustic insulation material as in claim 4, which has a thermal conductivity of 0.039 W/m•°C. or lower.

27. A thermal-acoustic insulation material as in claim 5, which has a thermal conductivity of 0.039 W/m•°C. or lower.

28. A thermal-acoustic insulation material as in claim 6, which has a thermal conductivity of 0.039 W/m•°C. or lower.

29. A thermal-acoustic insulation material as in claim 2, wherein a vertical incident acoustic absorptivity at a frequency of 1000Hz of said thermal-acoustic insulation material with a thickness of 25 mm is 48% or higher.

30. A thermal-acoustic insulation material as in claim 3, wherein a vertical incident acoustic absorptivity at a frequency of 1000Hz of said thermal-acoustic insulation material with a thickness of 25 mm is 48% or higher.

31. A thermal-acoustic insulation material as in claim 4, wherein a vertical incident acoustic absorptivity at a frequency of 1000Hz of said thermal-acoustic insulation material with a thickness of 25 mm is 48% or higher.

32. A thermal-acoustic insulation material as in claim 5, wherein a vertical incident acoustic absorptivity at a frequency of 1000Hz of said thermal-acoustic insulation material with a thickness of 25 mm is 48% or higher.

33. A thermal-acoustic insulation material as in claim 6, wherein a vertical incident acoustic absorptivity at a frequency of 1000Hz of said thermal-acoustic insulation material with a thickness of 25 mm is 48% or higher.

34. A thermal-acoustic insulation material as in claim 7, wherein a vertical incident acoustic absorptivity at a frequency of 1000Hz of said thermal-acoustic insulation material with a thickness of 25 mm is 48% or higher.

35. A thermal-acoustic insulation material as in claim 2, wherein said carbon fibers are produced from anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon.

36. A thermal-acoustic insulation material as in claim 3, wherein said carbon fibers are produced from anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon.

37. A thermal-acoustic insulation material as in claim 4, wherein said carbon fibers are produced from anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon.

38. A thermal-acoustic insulation material as in claim 5, wherein said carbon fibers are produced from anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon.

39. A thermal-acoustic insulation material as in claim 6, wherein said carbon fibers are produced from anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon.

40. A thermal-acoustic insulation material as in claim 7, wherein said carbon fibers are produced from anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon.

41. A thermal-acoustic insulation material as in claim 8, wherein said carbon fibers are produced from anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon.

42. (Amended) A method of manufacturing a thermal-acoustic insulation material as in claim 10, a temperature of carbonizing the spun fibers is not lower than 650°C. but lower than 750°C.

43. (Twice Amended) A method of manufacturing a thermal-acoustic insulation material as in claim 11, wherein a temperature of carbonizing the spun fibers is not lower than 650°C. but lower than 750°C.

In the event this paper is not timely filed, appellant hereby petitions for an appropriate extension of time. The fee for any such extension may be charged to our Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

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